REMARKS

Applicant respectfully submits that entry of this §1.116 Amendment is proper. Since the amendments above narrow the issues for appeal and merely clarify the subject matter of the claims. Applicant further respectfully submits that such amendments do not raise a new issue requiring a further search and/or consideration by the Examiner. As such, entry of this §1.116 Amendment is earnestly solicited.

Applicant gratefully acknowledges that the Examiner has allowed claims 5-8, 12, 31-34, and 38.

Claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42 are currently pending in the application. This Amendment currently amends claims 16, 40, and 42. No new matter is added to currently amended claims 16, 40, and 42. Claims 16, 40, and 42 are currently amended to merely clarify the subject matter of the claims and in no way narrow the scope of the claims in order to overcome the prior art or for any other statutory purpose of patentability.

Notwithstanding any claim amendments of the present Amendment or those amendments that may be made later during prosecution, Applicants' intent is to encompass equivalents of all claim elements. Reconsideration in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 16 and 42 stand rejected under 35 U.S.C. 112, second paragraph.

Claims 10, 36, and 40 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 6,181,849 to Lin et al. (hereinafter, Lin).

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

The claimed invention, as defined by independent claim 10, is directed to an arrayed waveguide grating that comprises a channel waveguide array including a plurality of waveguides, each successive waveguide of the plurality of waveguides being longer by a predetermined waveguide length difference, an input slab waveguide including an output end connected to an input end of the channel waveguide array, at least one output waveguide for

outputting signal lights, an output slab waveguide connecting an output end of the channel waveguide array to the at least one output waveguide, and a plurality of input waveguides connected to a surface of an input end of the input slab waveguide, in which central axes of selected input waveguides are displaced along a direction perpendicular to central axes of the input waveguides from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the at least one output waveguide.

The claimed invention, as defined by independent claim 36, is directed to a waveguide device that comprises an output waveguide, and a plurality of input waveguides connected to a surface of an input end of a slab waveguide, in which central axes of selected input waveguides are displaced along a direction perpendicular to central axes of the input waveguides from corresponding focusing positions by predetermined values to attenuate the signal lights propagated through the selected input waveguides to the output waveguide.

The claimed invention, as defined by independent claim 42, is directed to a waveguide device that comprises at least one output waveguide for outputting signal lights, and a plurality of input waveguides connected to an input end of a slab waveguide, in which each of selected input waveguides is displaced along its propagation axis by a shifted focus distance in a direction away from a cophasal plane of focusing positions to attenuate the signal lights propagated from the plurality of input waveguides to the at least one output waveguide.

An aspect of the present invention provides an arrayed waveguide grating that adjusts optical signal intensity outputs from respective waveguides without the need for active circuit components to provide attenuation differences.

II. THE PRIOR ART REJECTION

The Lin Reference

Figs. 7A, 7B, and 7C of Lin show an alternate design (i.e., an alternate design to that of Figs 5A, 5B, and 5C) for the second input waveguide port 74 (col. 6, lines 41-43) of two sets of the input waveguide ports 73 and 74 on opposite sides 69 and 71 of the same arrayed grating waveguide 67 (col. 4, lines 50-51). The alternate design uses the same waveguide output port design for all waveguide output ports but shifts the second waveguide input port

74 by a constant angle, which corresponds to the channel spacing $\Delta\lambda$ in the wavelength domain (col. 6, lines 43-47).

For the second waveguide input port 74, the corresponding input waveguide has a θ_i degree diffraction angle 99 at the second slab coupler, which shifts the $-\Delta\theta_o/2$ constant angular value 97 relative to the central zero line of the grating (col. 6, lines 47-52). A set of output waveguide ports, 86, 88, and 90 have the same constant angle spacing θ_o 91, which corresponds to a set of output even wavelengths λ_2, λ_4, λ_4 ... (col. 6, lines 52-55).

When the waveguide grating device contains different input and output angular spacings (i.e., $\Delta\theta_i \neq \Delta\theta_o$), as in 7A-C above, the asymmetrical I/O port design will yield different demultiplexed wavelengths, when a signal is input from a different input port and is output from a different output port (col. 2, lines 49-54). With this design, the center wavelength of a waveguide grating device can be adjusted by inputting the multiplexed signal at an off-center port, i.e., the so-called Vernier effect.

Claims 10 and 36 recite at least the features of "wherein central axes of selected input waveguides are displaced along a direction perpendicular to central axes of said input waveguides from corresponding focusing positions by predetermined values to attenuate said signal lights propagated through said selected input waveguides to said at least one output waveguide."

The Application clearly discloses that, as shown in Fig. 9, "[c]ompensation waveguide 132_{m+n-1}, which is positioned adjacent to compensation waveguide 132_{m+n}, has its central axis 141_{m+n-1} displaced from corresponding output waveguide focusing position p_{m+n-1} by a slight distance d_{m+n-1}. Because of the axial misalignment, the light having a Gaussian intensity distribution, which has been focused at output waveguide focusing position p_{m+n-1}, mismatches compensation waveguide 132_{m+n-1} when it is propagated therethrough, causing a light intensity loss (attenuation) (Application, page 81, lines 12-21).

In contrast, the invention of Lin shifts the second waveguide input port 74 by a constant angle, so that the asymmetrical I/O port design (i.e., $\Delta\theta_i \neq \Delta\theta_o$) will yield different demultiplexed wavelengths. Nowhere does Lin disclose, teach or suggest that shifting the second waveguide input port by a constant angle will attenuate (i.e. cause a loss of light intensity) the signal lights propagated through the selected input waveguides to the at least

one output waveguide, as recited in claims 10 and 36.

Furthermore, in order to obtain the Vernier effect of the symmetrical I/O port design of Lin's invention, the angular shift of the second waveguide input port must be constant. Nowhere does the claimed invention disclose, teach or suggest the limitation of the central axes of selected input waveguides are displaced along a direction perpendicular to central axes of said input waveguides from corresponding focusing positions by a value, corresponding to a constant angular shift.

Claim 40 recites at least the features of "wherein selected input waveguides, which are axially aligned with corresponding focusing positions, comprise a first end width and a second end width at said slab waveguide, such that attenuation of said signal lights, which are output, corresponds to attenuation of lights input through said first end width and said second end width."

Fig. 7B of Lin shows input port 73 having a number of input waveguides, which appear to have the same end width. Nowhere does Lin disclose, teach or suggest that the end widths of the input port 73 have a first end width and a second end width, as recited in claim 40 of the present invention. Likewise, Fig. 7C of Lin shows input port 74 having a number of input waveguides, which appear to have the same end width. Nowhere does Lin disclose, teach or suggest that the end widths of the input port 74 have a first end width and a second end width, as recited in claim 40 of the present invention.

For at least the reasons outlined above, Applicant respectfully submits that Lin does not disclose, teach or suggest every feature of claims 10, 36, and 40. Accordingly, Lin does not anticipate, or render obvious, the subject matter of claims 10, 36, and 40. Withdrawal of the rejection of claims 10, 36, and 40 under 35 U.S.C. §102(b) as anticipated by Lin is respectfully solicited.

III. THE 35 U.S.C. §112, SECOND PARAGRAPH, REJECTION

Claims 16 and 42 stand rejected under 35 U.S.C. 112, second paragraph, because the phrase "wherein lengths which extend from ends of selected input waveguides" is allegedly unclear.

Applicant respectfully submits that claims 16 and 42, as amended above, particularly

point out and distinctly claim the subject matter, which the Applicant regards as the invention, when considered in view of the fifth embodiment of the invention, which is clearly illustrated in Figs. 16-18 and described in detail from page 89, line 7 to page 92, line 18 of the Application. Withdrawal of the rejection of claims 16 and 42 under 35 U.S.C. 112, second paragraph, is respectfully solicited.

IV. CONCLUSION

In view of the foregoing, Applicant submits that claims 5-8, 10, 12, 16, 31-34, 36, 38, 40, and 42, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 2/10/04

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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that I am filing this Amendment by facsimile with the United States Patent and Trademark Office to Examiner Eric K. Wong, Group Art Unit 2874 at Official Facsimile Number (703) 872-9306 this 10th day of February, 2004.

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